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ESSENTIALS OF GOOD GINNING

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Your President has asked Mr. Bennett and me to come here to-day and discuss with you some of the essentials of good ginning. Mr. Bennett is unable to be with you, but we jointly have prepared a paper for my presentation in much the same fashion as that followed by him last year, and by me year before last.

When we talk about good ginning, we not only mean preserving the inherent qualities of cotton fibers through the ginning processes, but ginning efficiency as well, that is, economical operation or elimination of waste in power, together with maximum capacity and turnout without impairment to quality. These are matters that concern both the producer and the ginner. If the ginner can reduce operating costs by making savings in power and maintenance costs, he is in a better position to obtain satisfactory return on his investment and to give producers improved service by providing adequate facilities for ginning their cotton. We shall discuss these matters in more detail later.

Year after year, we have been coming before your group with the latest information on better ginning, and, therefore, shall endeavor in this paper to avoid repetition as much as possible. Since the basic factors that contribute to improved ginning do not change much, we shall only emphasize their importance and pass on to newer developments that are taking place. As pointed out by us before many ginning groups in recent years, good ginning practices involve not only the use of modern gin machine units, but the employment of improved methods in their operation.

Such practices have much to do with encouraging the adoption of methods of harvesting and handling cotton that contribute to higher quality ginned products. It is evident that the exercise of care in farm operations prior to ginning is just as important as the exercise of care during the actual ginning process. The ginner can render his best service only if and when the farmers use every precaution in their work. But, under present day conditions, a gin must be modern and operated intelligently and in accordance with improved practices, in order to achieve the best possible results and provide the service required of it.

Modern gin plants are of all-steel construction, with concrete foundation, floors, and platform. They are fireproof, conveniently arranged inside and outside, and properly lighted and ventilated, either artificially or naturally. The new gins that are being installed in the Mississippi Valley have adequate cleaning and extracting equipment, and they usually contain provision for drying green, damp, or wet cotton, either in connection with cleaning and extracting equipment or with separate chambers or towers. Unit-cleaner-extractor feeders and huller breasts are standard equipment. Incidentally, close to 70 percent of Tennessee gins are now equipped with extractor feeders as compared to 53 percent in 1935 and 44 percent in 1931 1/. Also, 21 of the 423 Tennessee gins had driers in 1939. Six hundred of the 1100 drier-equipped gins in the Cotton Belt in 1939 were located in the Mississippi Valley States.

The gins now on the market are of a design that permits loose seed roll operation with a capacity of at least a bale per hour per 80-saw stand. Saw speeds of modern gins are 600 to 700 revolutions per minute, as compared with about 400 revolutions per minute for many types of gins manufactured prior to 1930. The higher speeds contribute immensely to loose seed roll operation. Reasonable increases in gin saw speeds not only provide for better quality lint, but they make it possible to clean the seed better and improve gin turnout without impairing spinning quality. It is not uncommon to find any type of the later models of gins operated as high as 600 revolutions per minute, and many others as high as 700 revolutions per minute.

With increased production of and care in handling improved varieties of cotton, provision is being made for more conveniently and economically keeping seed pure at gins. Various means have been devised, the more commonly employed ones being the blow-pipe vacuum system under the gins, with connection to a fan handling clean air, and the belt system under the gins for feeding pure seed to sacks in the gin house, or to the blow system to the seed house. In two-story gins, screw conveyors have been converted to acceptable seed-saving devices by hinging the bottom so that it can be dropped for thorough cleaning of the conveyor box, augur, hangers, etc.

1/ Source of information on 1931 installations: Rural Research Series, Monograph No. 101. Cotton Ginning Equipment and Practices in Tennessee, by Charles E. Allred and Benjamin D. Raskopf.

Precautions to follow in the operation of a cotton gin can be divided into several general classifications. First, the cotton should be in the best condition possible before ginning and should not be too wet even if a drier is available, nor should it contain too much trash even though excellent and elaborate cleaning and extracting machinery is on the market. Present day drying, cleaning, and extracting equipment is not effective enough to put roughly harvested, trashy, or wet cotton in a condition that it will gin out a sample equal in quality to that ginned from clean cotton, handpicked under dry conditions. This type of machinery, however, has gone a long way toward preserving and improving the quality of American cotton.

In operating a cotton drier, assurance must be had that there is an adequate volume of air, and close attention must be given to the temperature of the drying air. For the usual run of damp or wet cotton, the drying temperature should not exceed 160° F. A slightly higher temperature can be used with very wet cotton, but under no circumstances should it exceed 200° F. It is seldom advisable to pick cotton when it is actually wet, because it is difficult to dry it even with mechanical driers. Cotton should be fed through the drier at a moderate rate--no faster than the gin stands can handle it--just as it must be fed to cleaners and extractors at a moderate rate in order to get efficient results.

The next important element involved in good ginning is the factor of seed roll density. Loose seed roll operation is essential, even with the dry short staple cottons, if smooth and superior preparation is to be obtained. There are a number of factors that influence seed roll density. Naturally the first to come to our mind is the matter of feeding any gin of any type or condition beyond its normal capacity. With the newer designs of gins, this is about the only cause of dense roll operation. With the older gins that operate with slow saw speeds and that have been neglected so far as repairs of important parts are concerned, satisfactory capacity can be attained only with dense seed roll operation, which causes rough preparation. Pre-ginning and "napping" of the cotton in the huller fronts may also result from heavy feeding. Furthermore, if the saws have been neglected and are dull or badly worn, they will not be efficient in removing the lint from the seed and the result will be denser seed rolls, and a consequent "napping" or poor preparation of the lint. Similarly, inadequate doffing of the lint from the saws because of badly worn or improperly adjusted brushes in brush gins, or because of a run-down air-blast system in air-blast gins, will produce tighter seed rolls at a given rate of feed than with efficient doffing mechanisms. A seed board too nearly closed or with lengthy spikes will prevent easy discharge of the seed from the roll box, which in turn will hinder loose seed-roll performance. Feeders sometimes are operated at such a high speed that even the lowest feed-setting provides too much cotton for loose seed-roll ginning.

Other precautions to follow in operating the gin stands themselves are to see that the principal parts are properly adjusted or set right for the particular kind of cotton being ginned. Proceeding with the route of the cotton through the gin, the picker rollers or hullers should be adjusted with each change in foreign matter content of the cotton as the season advances and rough cotton is encountered; they should be set further away from the saws as the cotton becomes rougher. The seed board position is directly related to the size of the seed of the cotton being ginned, the seed board needing to be wider open with the larger and fuzzier seeded cotton than with the smaller and less fuzzy seeded types. Seed rolls should be dumped periodically to get rid of accumulated foreign matter that causes two-sided bales when clean cotton is subsequently ginned with them. Mote boards or control dampers should be opened up enough to allow the motes to be expelled without taking usable fiber with them. Dividing boards and wind boards are important items to maintain in brush gins. Brushes should be so set in relation to the saw that the bristles lap the saws the full depth of the teeth and should be operated only at speeds that will remove all of the lint from the teeth and at the same time create enough air to convey it to the condenser. Air-blast pressure can be varied by a slide or cone valve on the intake of the fan, higher pressure being required as the moisture content of the cotton increases.

The lint flue air diversion valve should be set to give a uniform bat of lint from the condenser. There should be an adequate discharge of the air from the condenser to prevent back lash of the gins and irregular lint bats. The speed of the condenser should be slow enough to provide a fairly thick bat of lint to the press. To suit the condition of the cotton, the lint kicker speed should be varied or its position adjusted, and the lint slide position varied. The damper cottons, for instance, require faster speed, or forward or lower adjustment of the kicker or higher position of the lint slide than the drier cottons. Attention to the units from lint flue to the press should go a long way toward preventing big-ended and big-sided or rolling bales, and the cutting of them at compresses.

In the ginners' efforts to reduce gin operating costs so that improvements can be made more readily to give better service to producers, it is often necessary to make small savings in power and maintenance costs of numerous items in the gin--the sum total of which is frequently quite noticeable. Fan power requirements of 63 gins studied in the Delta averaged 40 percent of the total gin operating requirements. Ginners are effecting savings in fan power by lowering fan speeds, repairing fans, reducing separator air losses, correcting the size of cotton handling pipes, repairing leaky pipe connections, reducing the number of elbows in piping, substituting improved methods of handling seed for unloading fan exhaust blow method, adding control devices and gauges on fan inlets for regulating air requirements, and utilizing improved drives and bearings in operating fans.

One good example of power savings in these items is that which often can be made by doing away with or repairing leaky separators. In 14 Delta gins which had separator losses of 35 percent or more, the power required to operate the suction fan averaged 27.6 horsepower. In a similar group of 18 Delta gins having losses of less than 35 percent, the fan horsepower requirements averaged 19.2 horsepower, which is 8.4 horsepower, or 30 percent less than the average for those connected to leaky separators. Means for reducing the power requirements of other machine units of the gin include operating with loose seed rolls, avoiding the ginning of damp or wet cotton, feeding cleaners and extractors at uniform rates to prevent chokages and restriction of the cotton therein, delivering a uniform bat of lint cotton to the press, and avoiding big-ended or big-sided bales that require extra power and other losses in pressing.

In conclusion, I wish to say that Mr. Bennett and I appreciate the invitation that you extend to us each year to come to your meeting and to discuss ginning problems with you. We always are glad, of course, to be with you and to participate in your programs. But we want all of you to visit the U. S. Cotton Ginning Laboratory at Stoneville whenever you can. If any of you contemplate making changes in your ginning facilities or extending your efforts toward modernization, we shall be pleased to serve you in any way that we can if you get in touch with us or visit the Laboratory.